# Soccer Modelling Presentation

CS5232

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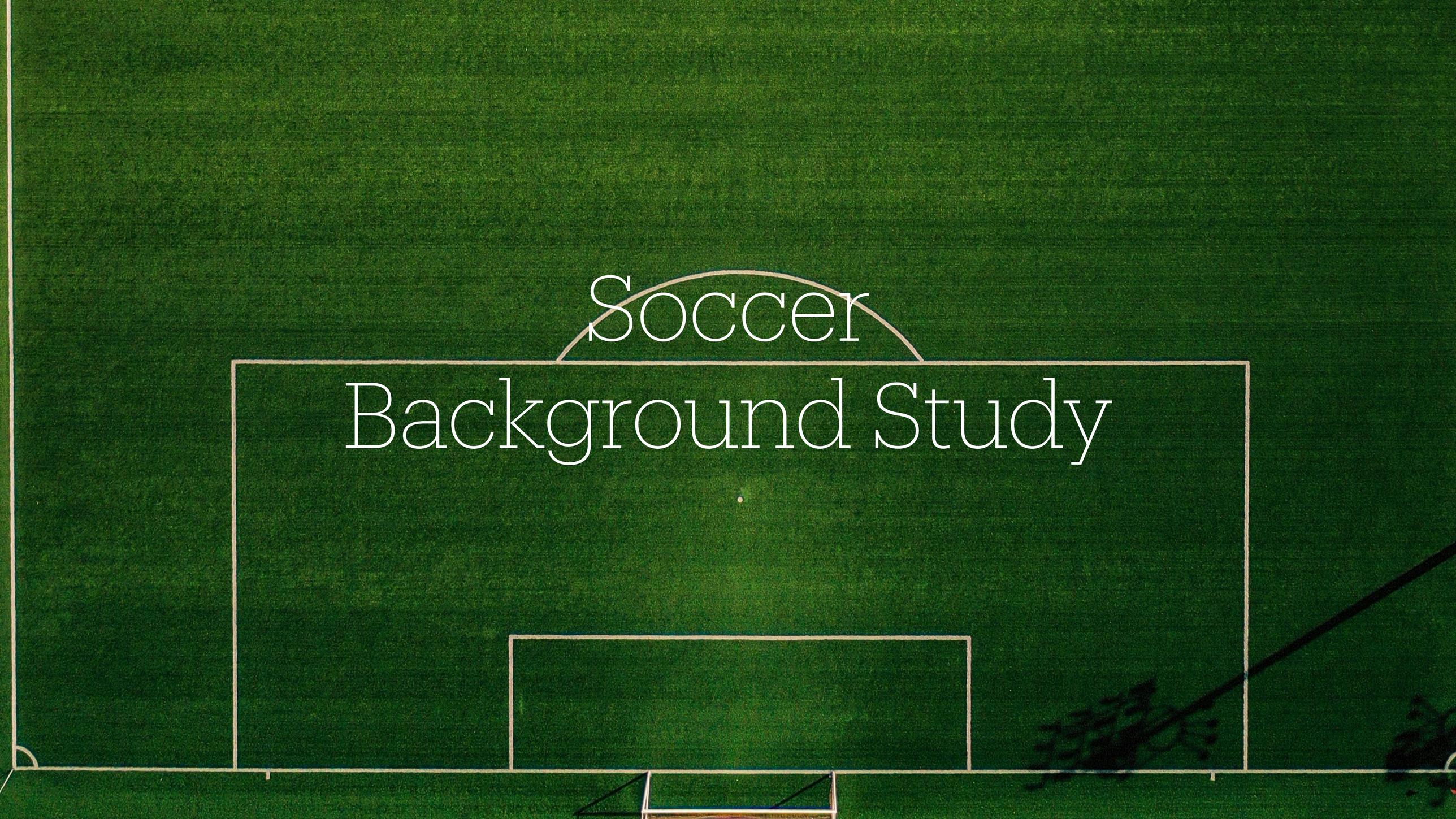

# Soccer Background Study

# Existing Model

## Player Positions and Actions

- The model defines various positions on the field (like Left, Center, Right) and assigns probabilities to different actions (like short passes, long passes, shots) based on FIFA player ratings.

- These actions are influenced by the players' positions and the ball's state (in the air or not).

Release clause €14.7M

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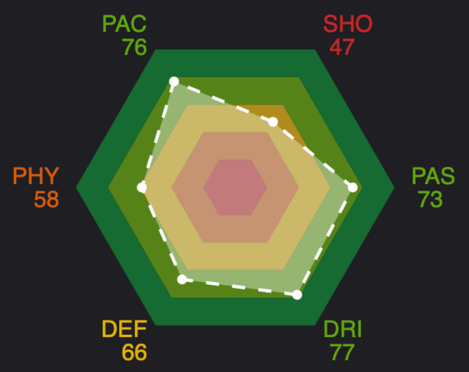


Layout 1 | 2 | 3

### Attacking

- 71 Crossing
- 42 Finishing
- 50 Heading accuracy
- 77 Short passing
- 30 Volleys

### Skill

- 77 Dribbling
- 75 Curve
- 60 FK Accuracy
- 72 Long passing
- 75 Ball control

### Movement

- 76 Acceleration
- 76 Sprint speed
- 82 Agility
- 73 Reactions
- 78 Balance

### Power

- 44 Shot power
- 59 Jumping
- 70 Stamina
- 48 Strength
- 52 Long shots

### Mentality

- 70 Aggression
- 65 Interceptions
- 73 Att. Position
- 72 Vision
- 67 Penalties
- 72 Composure

### Defending

- 68 Defensive awareness
- 68 Standing tackle
- 68 Sliding tackle

### Goalkeeping

- 12 GK Diving
- 10 GK Handling
- 9 GK Kicking
- 6 GK Positioning
- 12 GK Reflexes

### PlayStyles

- Technical
- Flair

# Existing Model

## Eligible Positions

- It calculates which positions on the field are eligible to receive the ball next, based on the current position and the last action taken.
- This ensures realistic ball movement and player interactions.

# Existing Model

## Danger Levels

- The model assesses the danger level for the attacking team, which likely impacts the probability of successful actions. Lower danger values indicate safer scenarios for the attacking team
- This ensures realistic ball movement and player interactions.

# Existing Model

## Probabilistic Outcomes

- Actions like passes, shots, and defensive moves are modelled with probabilities, reflecting the uncertainty and variability of real-life soccer.
- The outcomes depend on the players' skill ratings and the evolving match situation.

# Existing Model

## Match Simulation

- Through a series of probabilistic transitions, the model simulates the flow of the game, updating player positions, the ball's status, and the danger level, culminating in the likelihood of scoring goals

# Existing Model

## Assertions

- The model includes assertions to check the feasibility of scoring goals under different danger levels, providing a structured way to predict the outcome of attacks based on current match conditions

# Existing Model

## Betting Simulation

- After generating the probabilities coming from the model a Python script reads probability CSV file, real outcomes and calculates the hypothetical profit as a means of assessing the model's performance

# Our Contribution

# Our Contribution

## Faul

- In soccer, a foul is an unfair or illegal action committed by a player against an opponent or the opposing team, typically resulting in a free kick or penalty kick being awarded by the referee.
- We successfully implemented faul modelling.
- Each action has a faul as a possibility and the probability of this occurring negatively corresponds to the composure level of the player.

“A player’s composure refers to their ability to remain calm and control their emotions during matches”

Definition of composure on SoFifa

# Our Contribution

## Penalty and Free Kick

- The faul model automatically checks the position of the player that committed a faul and invokes free kick or penalty depending on whether the faul has been committed in the penalty area.

# Our Contribution

## Penalty Shot

- If the faul has been committed in penalty area, a function to modify the danger level will be invoked.
- The chance of penalty shot succeeding depends on penalty rating of the player

“A good rating will increase your chances of tucking away Penalties & give the keeper no chance”

Definition of Penalties on SoFifa

# Our Contribution

## Free Kick

- The function for free kicks simulate a non-serious faul to occur more frequently which leads to an indirect free kick and has a lower chance of succeeding

- A more serious faul leads to a direct kick where the probability of success is higher

- Free kick success probability also correlates to Penalties rating of the player

# Demo

Future Plans

# Future Plans

## Backward Shots

- The current model does not take into account backward movement by potentially using the crossing and ball control ratings in SoFifa dataset

- We intend to implement backward shots but in order to prevent infinite loops from happening we will limit how many backward shots can happen in a given match

# Future Plans

## Yellow & Red Cards

- The current model does not take into yellow and red cards given to players.
- We will be using aggression rating in SoFifa dataset to implement yellow and red cards
- Yellow card will negatively effect a player depending on their composure and reaction rating
- Red card will swap a player with a predefined backlog player

# Future Plans

## Changing Player Positions

- Since the player positions are currently fixed in the model we intend to implement players dynamically changing player positions
- This can be achieved by extending the grid and altering the grid positions

# Future Plans

## More Events

- We will be implementing more events for the model such as crosses and breaking up forwards to have an extra step of moving closer to the goal post.

# Future Plans

## Automation

- We will be implementing a Python automation pipeline to dynamically assess the performance of our model

- We will be also testing features in isolation so that we know for sure which features correspond to the biggest yield and come up with the most successful subset of features

# Thank you